ATTACHMENT 19
INSTRUMENTATION AND WASTE FEED CUT-OFF TABLES

Consisting of:

Table D-1, Trial Burn Plans and Reports

Table D-5-1A, Liquid Incinerator #1 Process Data

Table D-5-2A, Liquid Incinerator #1 Automatic Waste Feed Cut-offs

Table D-5-1B, Liquid Incinerator #2 Process Data

Table D-5-2B, Liquid Incinerator #2 Automatic Waste Feed Cut-offs

Table D-6-1, Metal Parts Furnace Process Data

Table D-6-2, Metal Parts Furnace Waste Feed Cut-offs

Table D-7-1, Deactivation Furnace System Process Data

Table D-7-2, Deactivation Furnace System Automatic Waste Feed Cut-offs

Table D-1
TRIAL BURN PLANS AND REPORTS

Surrogate Trial Burn for Liquid Incinerator Number 1 (LIC1)

- Surrogate Trial Burn Plan, submitted January 24, 1995 and revised April 24, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.00325 and 95.01951.

- Surrogate Trial Burn Report submitted August 23, 1995, and revised December 1, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.03837 and 95.05298.

Surrogate Trial Burn for the Deactivation Furnace System (DFS)

- Surrogate Trial Burn Plan, submitted March 9, 1995 and revised August 8, 1995. Supplemental DFS Trial Burn Test Special Conditions appended September 6, 1995. Utah Division of Solid and Hazardous Waste Tracking Number 95.03661.

- Surrogate Trial Burn Report, submitted November 20, 1995, and revised December 12, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.05217 and 96.00196.

Surrogate Trial Burn for Liquid Incinerator Number 2 (LIC2)

- Surrogate Trial Burn Plan, submitted June 15, 1995, and revised December 18, 1995. Utah Division of Solid and Hazardous Waste Tracking Number 95.05551.

- Surrogate Trial Burn Report, dated April 19, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.01988

Surrogate Trial Burn for Metal Parts Furnace (MPF)

- Surrogate Trial Burn Plan, submitted December 19, 1995, and revised March 13, 1996. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.05572 and 96.01181.

- Surrogate Trial Burn Report, dated August 12, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.03460.

RCRA GB Agent Trial Burn for the Deactivation Furnace System (DFS)

- GB Agent Trial Burn Plan, submitted November 29, 1995, revised June 6, 1996 and August 13, 1998. Utah Division of Solid and Hazardous Waste Tracking Numbers 96.02580 and 98.03264.

- GB Agent Trial Burn Report, dated February 16, 1999, and revised July 7, 1999. Utah Division of Solid and Hazardous Waste Tracking Numbers 99.00735 and 99.02812

RCRA GB Agent Trial Burn for the Liquid Incinerators (LIC)

- GB Agent Trial Burn Plan, submitted November 29, 1995, and revised June 12, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.02670.

- GB Agent Trial Burn Report Liquid Incinerator 1(LIC1), submitted Revision 2 dated July 15,

1998. Utah Division of Solid and Hazardous Waste Tracking Number 97.02654.

- GB Trial Burn Report for the Liquid Incinerator 2 (LIC 2), dated October 27, 1997. Utah Division of Solid and Hazardous Waste Tracking Number 97.04218.

RCRA GB Agent Trial Burn for the Metal Parts Furnace (MPF)

- GB Agent Trial Burn Plan, submitted April 20, 1996, and revised October 30, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.04738. Modified March 12, 1997, Utah Division of Solid and Hazardous Waste Tracking Number 97.01013.

- GB Agent Trial Burn Report, dated July 29, 1997. Utah Division of Solid and Hazardous Waste Tracking Number 97.03183.

RCRA VX Agent Trial Burn for the Deactivation Furnace System (DFS)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02406, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002.

RCRA VX Agent Trial Burn for the Metal Parts Furnace (MPF)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02408, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002.

RCRA VX Agent Trial Burn for the Liquid Incinerators (LIC)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02407, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002

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Table D-5-1A
LIQUID INCINERATOR #1
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
1[a,b,c]	Agent Feed Rate to Primary Chamber 13-FIT-127A 13-FIT-127B	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 1,500 lb/hr	0 - 900 lb/hr
2[b,c]	Agent Feed Atomizing Air Pressure 13-PIT-128	Diaphragm	Plant Air Line prior to Pri. Chamber Waste Feed Atomizing Nozzle	0 - 200 psig	60 - 75 psig
3[b,c]	Agent Gun Nozzle Pressure 13-PIT-112	Diaphragm	Agent Line after Pump	0 - 25 psig	5 - 25 psig
4[b,c]	Primary Chamber Pressure 13-PIT-052	Diaphragm	Incinerator	-20.0 - 5.0 in. w.c.	-5.0 to -0.25 in. w.c.
4.a[d,e]	Primary Chamber Pressure High Waste Feed Interlock 13-PSHH-233	Diaphragm	Incinerator	-0.5 - 0.5 in. w.c.	setpoint -0.25 in. w.c.
5[b,c]	Primary Chamber Exhaust Gas Temp. 13-TIT-610	Thermocouple	In-Line	212 - 3,000° F	2,550 - 2,850° F
5.a[bc]	Primary Chamber Exhaust Gas Temp. Gas Temperature Low Waste Feed Interlock 13-TSLL-610	Current Switch	In-Line	4 - 20 mA	Setpoint 2,550° F
6[b,c]	Secondary Chamber Spent Decon/Process Water Feed Rate 13-FIT-102	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 2,250 lbs/hr	0 - 1,920 lbs/hr.
7[d,e]	Secondary Chamber Spent Decon/Process Atomizing Air Press. Waste Feed Interlock 13-PSL-058	Diaphragm	Plant Air Line prior to Sec. Chamber Waste Feed Atomizing Nozzle	12 - 100 psig	Setpoint 60 psig
8[d,e]	Secondary Chamber Slag Gate Open Waste Feed Interlock 13-ZS-367B	Limit Switch	Outside Bottom Secondary Chamber	Not Applicable	Not Applicable
9[b,c]	Secondary Chamber Exhaust Gas Temp. 13-TIT-129	Thermocouple	Incinerator Outlet	32 - 2,400° F	1,850-2,200° F
9.a[d,e]	Secondary Chamber Exhaust Gas Temp. Low Gas Temperature Waste Feed Interlock 13-TSLL-129	Current Switch	In-Line	4 - 20 mA	Setpoint 1,850° F
10[b,c]	Exhaust Gas Flow Rate 24-FIT-9431A, 24-FIT-9431B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-103 outlet	1,477-14,765 acfm	10,200-14,000 acfm
10a[b,c]	V-Cone Pressure (STP pressure Correction) 24-FIT-9431	Diaphram	In-Line at packed bed scrubber PAS SCRB-103 outlet	8-13 psia	10-11 psia
10b[b,c]	V-Cone Temperature (STP Temperature Correction) 24-TIT-9431	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-103 outlet	100-200° F	140-180° F

Table D-5-1A
LIQUID INCINERATOR #1
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
11[b,c]	Quench Tower Exhaust Gas Temp. 24-TIT-397	Thermocouple	In-Line	0 - 300° F	140 - 225° F
11.a[d,e]	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock 24-TSHH-089	Filled System	In-Line	175 - 360° F	Setpoint 225° F
12[b,c]	Quench Brine Delivery Pressure 24-PIT-100	D/P Cell	In-Line	0 - 150 psig	40 - 150 psig
13[b,c]	Quench Brine to Venturi Scrubber 24-FIT-088	Electro-Magnetic Flowmeter	In-Line	0 - 150 gpm	100 - 120 gpm
14[b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-090	D/P Cell	Venturi Scrubber	0 – 50 in. w.c.	20 - 50 in. w.c.
15[b,c]	Clean Liquor to Scrubber Tower Sprays 24-FIT-112	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 – 800 gpm
16[b,c]	Clean Liquor Delivery Pressure 24-PIT-129	D/P Cell	In-Line	0 - 100 psig	25 - 100 psig
17[b,c]	Scrubber Brine pH 24-AIT-091A[f] 24-AIT-091B	Electrodes	Discharge From Pump 111/112	0 - 14 pH Units	7.0 - 11.0 pH
18[b,c]	Scrubber Brine Specific Gravity 24-DIT-083	Magnetically Vibrated Tube	Pump-PAS-111/112 Disch	0.6 - 1.4 SGU	1.0 - 1.20 SGU
19[b,c,g]	Blower Exhaust Gas CO 24-AIT-078	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 3,000 ppm	0-100 ppm, one hour rolling average, corrected to 7% O_2 dry volume.
20[b,c,g]	Blower Exhaust Gas CO 13-AIT-083	Infrared Cell Analyzer	In-Line (Extractive)	0 - 200 & 0 - 3,000 ppm	0-100 ppm, one-hour rolling average,. corrected to 7% O_2 dry volume.
21[b,c]	Blower Exhaust Gas O_2 24-AIT-210	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
22[b,c]	Blower Exhaust Gas O_2 13-AIT-229	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
23[e]	Blower Exhaust Gas Agent PAS 704V[h]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]
24[e]	Common Stack Exhaust Gas Agent PAS 701G[i]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]
24a[e]	Common Stack Exhaust Gas Agent PAS 706V[i]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]
25[e]	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable

Table D-5-1A
LIQUID INCINERATOR #1
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
26	Slag Removal System Shell 13-TIT-374, 13-TIT-375, 13-TIT-376, 13-TIT-377	Thermocouple	In-Line	0-1000° F	70-500° F

Table D-5-1A
LIQUID INCINERATOR #1
PROCESS DATA

Footnotes:

1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).

* Calibration information is shown in Attachment 6.

[a] Reported value for agent feed rate is calculated by averaging the output of both mass flow transmitters.

[b] Continuous monitoring with values being recorded electronically, approximately every 30 seconds.

[c] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.

[d] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.

[e] Recorded upon activation or change in state of switch.

[f] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.

[g] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.

[h] PAS 704AV and PAS 704BV are the TAG IDs for the sampling location. One ACAMS is online at this location. A backup monitor is available if the primary monitor is taken offline. During Agent Trial Burn performance runs, two ACAMS will be on-line at all times during agent feed.

[i] PAS 701 and PAS 706 are the TAG IDs for the sampling location. Two ACAMS are on-line with collocated DAAMS tubes at all times during agent operation for each agent.

[j] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or H/HD/HT.

[k] ASC (Allowable Stack Concentration) - Threshold values for the concentration of chemical agents in incinerator exhaust gases which have been established by the Surgeon General of the United States to protect human health and the environment. The ASC (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and H/HD/HT = 0.03.

Table D-5-2A
LIQUID INCINERATOR #1
AUTOMATIC WASTE FEED CUT-OFFS

Item No.	Tag Number	Process Data Description[C]	Setpoint[f]*
1.	13-FIC-127	Agent Feed Rate Greater Than or Equal to	≥ 444 lb/hr Nerve Agent, one-hour rolling average
2	13-PAL-128	Agent Atomizing Air Pressure Less Than	< 60 psig
3	13-PALL-112B	Agent Feed Nozzle Pressure at High Feed Rate Less Than or Equal to	≤ 5 psig active 10 sec after LIC agent feed pump is started and at feed rates greater than 500 lbs/hr
4	Reserved		
5	13-TIT-610	Primary Chamber Temperature Less Than	< 2,5330° F
5.a	13-TAHH-610	Primary Chamber temperature Greater Than or Equal to	≥ 2,850° F
6.	13-FIC-102	Spent Decon Feed Rate Greater Than or Equal to	≥ 1,479 lb/hr over one-hour rolling
7	13-PSL-058	Spent Decon Atomizing Air Pressure Less Than or Equal to	≤ 60 psig
8	13-ZS-367B	Slag Removal System Discharge Gate Open	Upper Cylinder Switch Closed
9	13-TIT-129	Secondary Chamber Temperature Less Than	< 1,851° F
9.a	13-TAHH-129	Secondary Chamber Temperature Greater Than or Equal to	≥ 2,200° F
10	24-FIT-9431	Exhaust Gas Flow Rate(Unit Production Rate) Greater Than or Equal to	8,613 scfm, one-hour rolling average
11	24-TSHH-089	Quench Tower Exhaust Gas Temperature Greater Than	> 225° F
12	24-PALL-100	Quench Brine Pressure Less Than or Equal to	≤ 40 psig
13	24-FIT-088	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 106 gpm one-hour rolling average
14	24-PDIT-090	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 35 in. w.c., one-hour rolling average
15	24-FIT-112	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 450 gpm, one-hour rolling average
16	24-PIT-129	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig, one-hour rolling average
17	24-AIT-091	Scrubber Brine to Venturi Scrubber pH Less Than to Equal to	≤ 7.3 pH, one-hour rolling average
18	24-DIC-083	Brine Specific Gravity Greater Than or Equal to	≥ 1.15 SGU, twelve-hour rolling average
19	24-AIT-078	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
20	13-AIT-083	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
21	24-AAL-210	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
21.a	24-AAH-210	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
22	13-AAL-229	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
22.a	13-AAH-229	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
23	PAS 704V	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.5 ASC[b,e]
24	PAS 701G	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 ASC[b,d]
24a	PAS 706V	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 ASC[b,d]
25	BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-002 and 23-LSHH-006 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level
26	13-TAHH-374, 13-TAHH-375, 13-TAHH-376, 13-TAHH-377	SRS Shell Thermocouple Temperature Greater Than or Equal to	≥ 500° F

Table D-5-2A
LIQUID INCINERATOR #1
AUTOMATIC WASTE FEED CUT-OFFS

Item No.	Tag Number	Process Data Description[C]	Setpoint[f]*

Footnotes

* Waste feed cut-offs recorded upon switch activation.

[a] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.

[b] The alarm setting (in mg/m^3) for each agent is: GB =0.00006, VX =0.00006, and H/HD/HT = 0.006.

[c] Logic code description used to set the control WFCO alarms.

[d] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[e] The alarm setting (in mg/m^3) for VX is 0.00015.

[f] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
1[a,b,c,d]	Agent Feed Rate to Primary Chamber 13-FIT-731A 13-FIT-731B	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 1,500 lb/hr	0 - 900 lb/hr
2[b,c,d]	Agent Feed Atomizing Air Pressure 13-PIT-736	Diaphragm	Plant Air Line prior to Pri. Chamber Waste Feed Atomizing Nozzle	0 - 200 psig	60 - 75 psig
3[b,c,d]	Agent Gun Nozzle Pressure 13-PIT-760	Diaphragm	Agent Line after Pump	0 - 25 psig	5 - 25 psig
4[b,c,d]	Primary Chamber Pressure 13-PIT-706	Diaphragm	Incinerator	-20.0 - 5.0 in. w.c.	-5.0 to -0.25 in. w.c.
4.a[d,e]	Primary Chamber Pressure High Waste Feed Interlock 13-PSHH-845	Diaphragm	Incinerator	-0.5 - 0.5 in. w.c.	setpoint -0.25 in. w.c.
5[b,c,d]	Primary Chamber Exhaust Gas Temp. 13-TIT-710	Thermocouple	In-Line	212 - 3,000° F	2,550 -2,850° F
5.a[d,e]	Primary Chamber Exhaust Gas Temp. Gas Temperature Low Waste Feed Interlock 13-TSLL-710	Current Switch	In-Line	4 - 20 mA	Setpoint 2,550° F
6[b,c,d]	Secondary Chamber Spent Decon/Process Water Feed Rate 13-FIT-763	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 2,250 lbs/hr	0 - 1,920 lbs/hr.
7[d,e]	Secondary Chamber Spent Decon/Process Atomizing Air Press. Waste Feed Interlock 13-PSL-809	Diaphragm	Plant Air Line prior to Sec. Chamber Waste Feed Atomizing Nozzle	12 - 100 psig	Setpoint 60 psig
8[d,e]	Secondary Chamber Slag Gate Open Waste Feed Interlock 13-ZS-567B	Limit Switch	Outside Bottom Secondary Chamber	Not Applicable	Not Applicable
9[b,c,d]	Secondary Chamber Exhaust Gas Temp. 13-TIT-782	Thermocouple	Incinerator Outlet	32 - 2,400° F	1,850-2,200° F
9.a[d,e]	Secondary Chamber Exhaust Gas Temp. Low Gas Temperature Waste Feed Interlock 13-TSLL-782	Current Switch	In-Line	4 - 20 mA	Setpoint 1,850° F
10[b,c,d]	Secondary Chamber Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9902A, 24-FIT-9902B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-203 outlet	1,477-14,765 acfm	10,200-14,000 acfm
10a[b,c,d]	V-Cone Pressure (STP Pressure correction) 24-PIT-9902	Diaphram	In-Line at packed bed scrubber PAS-SCRB-203 outlet	8-13 psia	10-11 psia

Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
10b[b,c,d]	V-Cone Temperature (STP temperature correction) 24-TIT-9902	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-203 outlet	100-200° F	140-180° F
11[b,c,d]	Quench Tower Exhaust Gas Temp. 24-TIT-816	Thermocouple	In-Line	0 - 300° F	140 - 225° F
11.a[d,e]	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock 24-TSHH-800	Filled System	In-Line	175 - 360° F	Setpoint 225° F
12[b,c,d]	Quench Brine Delivery Pressure 24-PIT-838	D/P Cell	In-Line	0 - 150 psig	40 - 150 psig
13[b,c,d]	Quench Brine to Venturi Scrubber 24-FIT-828	Electro-Magnetic Flowmeter	In-Line	0 - 150 gpm	100 - 120 gpm
14[b,c,d]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-814	D/P Cell	Venturi Scrubber	0 – 50 in. w.c.	20 - 50 in. w.c.
15[b,c,d]	Clean Liquor to Scrubber Tower Sprays 24-FIT-825	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 - 800 gpm
16[b,c,d]	Clean Liquor Delivery Pressure 24-PIT-839	D/P Cell	In-Line	0 - 100 psig	25 – 100 psig
17[b,c,d]	Scrubber Brine pH 24-AIT-831A[f] 24-AIT-831B	Electrodes	Discharge From Pump 111/112	0 - 14 pH Units	7.0 - 11.0 pH
18[b,c,d]	Scrubber Brine Specific Gravity 24-DIT-835	Magnetically Vibrated Tube	Pump-PAS-111/112 Disch.	0.6 - 1.40 SGU	1.0 - 1.20 SGU
19[b,c,g]	Blower Exhaust Gas CO 24-AIT-716	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 3,000 ppm	0-100 ppm, one-hour rolling average, corrected to 7% O_2 dry volume.
20[b,c,g]	Blower Exhaust Gas CO 13-AIT-778	Infrared Cell Analyzer	In-Line (Extractive)	0 - 200 & 0 - 3,000 ppm	0-100 ppm, one-hour rolling average, corrected to 7% O_2 dry volume.
21[b,c]	Blower Exhaust Gas O_2 24-AIT-717	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
22[b,c]	Blower Exhaust Gas O_2 13-AIT-798	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
23[e]	Blower Exhaust Gas Agent PAS 705V[h]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]
24[e]	Common Stack Exhaust Gas Agent PAS 701G[i]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]
24a	Common Stack Exhaust Gas Agent PAS 706V[i]	ACAMS[j]	In-Line(Extractive)	0 - 512 ASC[k]	0 - 1.0 ASC[k]

Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
25[e]	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable
26	Slag Removal System Shell 13-TIT-574, 13-TIT-575, 13-TIT-576, 13-TIT-577	Thermocouple	In-Line	0-1000° F	70-500° F

Footnotes:
1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
* Calibration information is shown in Attachment 6.
[a] Reported value for agent feed rate is calculated by averaging the output of both mass flow transmitters.
[b] Continuous monitoring with values being recorded electronically, approximately every 30 seconds.
[c] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.
[d] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.
[e] Recorded upon activation or change in state of switch.
[f] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.
[g] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.
[h] PAS 705AV and PAS 705BV are the TAG IDs for the sampling location. One ACAMS is online at this location. A backup ACAMS is available if the primary monitor is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be on-line at all times during agent feed.
[i] PAS 701 and PAS 706 are the TAG IDs for the sampling location. Two ACAMS are on-line and collocated DAAMS tubes at all times during agent operations for each agent.
[j] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or H/HD/HT.
[k] ASC (Allowable Stack Concentration) - Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The ASC (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and H/HD/HT = 0.03.

Table D-5-2B
LIQUID INCINERATOR #2
AUTOMATIC WASTE FEED CUT-OFFS

Item No.	Tag Number	Process Data Description[c]	Setpoint[f]*
1.	13-FIC-731	Agent Feed Rate Greater Than or Equal to	≥ 444 lb/hr Nerve Agent, one=-hour rolling average
2	13-PAL-736	Agent Atomizing Air Pressure Less Than	< 60 psig
3	13-PALL-760B	Agent Feed Nozzle Pressure at High Feed Rate Less Than or Equal to	≤ 5 psig active 10 sec. after LIC feed pump is started and at feed rates greater than 500 lbs/hr
4	13-PSHH-845	Primary Chamber Pressure Greater Than	> -0.25 in. w.c. with a 10 second delay
5	13-TIT-710	Primary Chamber Temperature Less Than	< 2,533° F
5.a	13-TAHH-710	Primary Chamber temperature Greater Than or Equal to	≥ 2,850° F
6.	13-FIC-773	Spent Decon Feed Rate Greater Than or Equal to	≥ 1,479 lbs/hr, one-hour rolling average
7	13-PSL-809	Spent Decon Atomizing Air Pressure Less Than or Equal to	≤ 60 psig
8	13-ZS-567B	Slag Removal System Discharge Gate Open	Upper Cylinder Switch Closed
9	13-TIT-782	Secondary Chamber Temperature Less Than	< 1,851° F, one-hour rolling average
9.a	13-TAHH-782	Secondary Chamber Temperature Greater Than or Equal to	≥ 2,200° F
10	13-FIT-9902	Exhaust Gas Flow Rate (Unit Production Rate) Greater Than or Equal to	8,613 scfm, one-hour rolling average
11	24-TSHH-800	Quench Tower Exhaust Gas Temperature Greater Than	> 225° F
12	24-PALL-838	Quench Brine Pressure Less Than or Equal to	≤ 40 psig
13	24-FIT-828	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 106 gpm, one-hour rolling average
14	24-PDIT-814	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 35 in. w.c., one-hour rolling average
15	24-FIT-825	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 450 gpm, one-hour rolling average
16	24-PIT-839	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig
17	24-AIT-831	Scrubber Brine to Venturi Scrubber pH Less Than or Equal to	≤ 7.3 pH, one-hour rolling average
18	13-DIC-835	Brine Specific Gravity Greater Than or Equal to	≥ 1.15 SGU, twelve-hour rolling average
19	24-AIT-716	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
20	13-AIT-778	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
21	24-AAL-717	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
21.a	24-AAH-717	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
22	13-AAL-798	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
22.a	13-AAH-798	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
23	PAS 705V	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.5 ASC[b,e]
24	PAS 701G	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 ASC[b,d]
24a	PAS 706V	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 ASC[b,d]
25	23-BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-002 and 23-LSHH-006 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level
26	13-TAHH-574, 13-TAHH-575, 13-TAHH-576, 13-TAHH-577	SRS Shell Thermocouple Temperature Greater Than or Equal To	≥ 500° F

Footnotes

* Waste feed cut-offs recorded upon switch activation

[a] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.

[b] The alarm setting (in mg/m^3) for each agent is: GB =0.00006, VX =0.00006, and H/HD/HT = 0.006.

[C] Logic code description used to set the control WFCO alarms.

[d] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[e] The alarm setting (in mg/m^3) for VX agent is 0.00015.

[f] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

Table D-6-1
METAL PARTS FURNACE
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
1[a,b,c]	MPF Primary Chamber Temperature Zone 1 14-TIT-152[2] 14-TIT-391	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
2[a,b,c]	MPF Temperature Zone 2 14-TIT-141[2] 14-TIT-392	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
3[a,b,c]	MPF Primary Chamber Temperature Zone 3 14-TIT-153[2] 14-TIT-393	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
4[a,b]	MPF Primary Chamber Diff. Pressure 14-PIT-070	D/P Cell	Furnace	-10.0 - 0.0 in. w.c.	-6.0 to -4.0 in. w.c.
4.a.	MPF Primary Chamber Diff. Pressure High Waste Feed Interlock 14-PSHH-034	Current Switch	Furnace	- 10 - 0 in. w.c.	set point - 0.1 in. w.c.
5[a,b,c]	MPF Afterburner Temperature 14-TIT-065[2] 14-TIT-069	Thermocouple	Afterburner	32- 2,700° F	1,800 - 2,175° F
6[a,b,c]	MPF Afterburner Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9667A, 24-FIT-9667B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-101 outlet	1,494-14,942 acrm	10,000-14,000 acfm
6a[a,b,c]	V-Cone Pressure (STP Pressure Correction) 24-PIT-9667	Diaphram	In-Line at packed bed scrubber PAS-SCRB-101 outlet	8-13 psia	10-11 psia
6b[a,b,c]	V-Cone Temperature (STP Temperature Correction)	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-101 outlet	100-200° F	140-180° F
7[a,b,c]	Quench Tower Exhaust Gas Temperature 24-TIT-509	Thermocouple	In-Line	0 - 300° F	140 - 225° F
7.a.[a,b,c]	Quench Tower Exhaust Gas Temp. High Waste Feed Interlock 24-TSHH-223	Filled System	In-Line	175 - 360° F	set point 225° F
8[a,b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-222	D/P Cell	Venturi Scrubber	0 – 50 in. w.c.	20 - 50 in. w.c.
9[a,b,c]	Quench Brine to Venturi Scrubber 24-FIT-218	Electro-Magnetic Flowmeter	In-Line	0 – 150 gpm	50 - 150 gpm
10[a,b,c]	Quench Brine Pressure 24-PIT-233	D/P Cell	In-Line	0 – 150 psig	70 – 140 psig
11[a,b,c]	Clean Liquor to Scrubber Tower Sprays 24-FIT-248	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 – 900 gpm
12[a,b,c]	Clean Liquor Delivery Pressure 24-PIT-258	D/P Cell	In-Line	0 – 100 psig	25 – 100 psig

Table D-6-1
METAL PARTS FURNACE
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
13[a,b,c]	Quench Brine Specific Gravity 24-DIT-216	Magnetically Vibrated Tube	Pump PAS Pump-102/103 Discharge	0.6 - 1.4 SGU	1.0 - 1.20 SGU
14[a,b,c]	Quench Brine pH 24-AIT-224A[d] 24-AIT-224B	Electrodes	Pump PAS-Pump-102/103 Discharge	0-14 pH Units	7-11 pH
15[a,b,c]	Blower Exhaust Gas CO 14-AIT-384	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0-3,000 ppm	0 – 100 ppm, one-hour rolling average.
16[a,b,c]	Blower Exhaust Gas CO 24-AIT-669	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 3,000 ppm	0 – 100 ppm, one-hour rolling average
17[a,b,c]	Blower Exhaust Gas O_2 14-AIT-082	Zirconium Oxide Cell Analyzer	Blower Exhaust Line (In-Situ)	0-25%	3 - 15%
18[a,b,c]	Blower Exhaust Gas O_2 24-AIT-670	Zirconium Oxide Cell Analyzer	Blower Exhaust Line (In-Situ)	0-25%	3 - 15%
19	Blower Exhaust Gas Agent PAS 703G, PAS 703V[e]	ACAMS[g]	In-Line (Extractive)	0 - 512 ASC[h]	0 - 1.0 ASC
20	Common Stack Exhaust Gas Agent PAS 701G[f]	ACAMS[g]	In-Line (Extractive)	0 - 512 ASC[h]	0 - 1.0 ASC
20a	PAS 706V	ACAMS[g]	In-Line (Extractive)	0 - 512 ASC[h]	0 - 1.0 ASC
21	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable
22	Primary to Secondary Duct Temperature 14-TIT-010	Thermocouple	Duct	0- 2,282° F	1,800 - 2,282° F

Footnotes:

1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
2. Control loop corresponds to Tag. ID number. The controller averages the two transmitters if the outputs differ by less than 32 ° F. The controller uses the lowest output if the transmitter outputs differ by more than 32 ° F. Thermocouples fail high.

[a] Continuous monitoring with values being recorded electronically, approximately every 30 seconds

[b] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.

[c] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.

[d] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.

[e] PAS 703AV, PAS 703BV and PAS 703CG, PAS 703DG are the TAG IDs for the sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary monitor is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be online at all times during agent feed.

[f] PAS 701 and 706 are the TAG IDs for the sampling location. Two ACAMS are online and collocated DAAMS tubes at all times during agent operations for each agent.

[g] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or H/HD/HT.

[h] ASC (Allowable Stack Concentration) - Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The ASC (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and H/HD/HT = 0.03.

* Calibration information is shown in Attachment 6.

Table D-6-2
METAL PARTS FURNACE SYSTEM
AUTOMATIC WASTE FEED CUTOFF

Item Number	Tag Number	Process Data Description	Setpoint[g,a]
1	14-TIT-152	Furnace Temperature Low-Low (Zone 1)	< 1,200° F
1.a.	14-TAHH-152	Furnace Temperature High-High (Zone 1)	> 1,700° F
2	14-TIT-141	Furnace Temperature Low-Low (Zone 2)	< 1,200° F
2.a.	14-TAHH-141	Furnace Temperature High-High (Zone 2)	> 1,700° F
3	14-TIT-153	Furnace Temperature Low-Low (Zone 3)	< 1,200° F
3.a.	14-TAHH-153	Furnace Temperature High-High (Zone 3)	> 1,700° F
4	14-PSHH-034	Primary Chamber Pressure High High	> -0.1 in. w.c., 5 Second Delay
5	14-IT-065	MPF Afterburner Temperature Low-Low	< 1,900° F, one-hour rolling average
5.a.	14-TAHH-065	Afterburner Temperature High-High	> 2175° F
6	24-FIT-9667	Afterburner Exhaust Gas Flow Rate (Unit Production Rate)	7,893 scfm, one-hour rolling average
7	24-TSHH- 223	Quench Tower Exhaust Gas Temperature High-High	> 225° F
8	24-PDIT-222	Venturi Exhaust Gas Pressure Drop Low-Low	≤ 25 in. w.c., one-hour rolling average
9	24-FIT-218	Brine to Venturi Scrubber Flow Low	< 90 gpm, one-hour rolling average
10	24-PALL-233	Quench Brine Pressure Low-Low	≤ 70 psig
11	24-FIT-248	Clean Liquor to Scrubber Tower Low-Low	≤ 450 gpm, one-hour rolling average
12	24-PIT-258	Clean Liquor Pressure Low-Low	≤ 35 psig, one-hour rolling average
13	624-DIC-216	Quench Brine Specific Gravity High-High	≥ 1.12 SGU, twelve rolling average
14	24-AIT-224	Brine to Venturi Scrubber pH Low	≤ 8.3 pH, one-hour rolling average
15	14-AIT-384	Blower Exhaust CO Concentration	≥ 100 ppm, one-hour rolling average. Corrected to 7%-O_2 dry volume[b]
16	24-AIT-669	Blower Exhaust CO Concentration	≥ 100 ppm, one-hour rolling average Corrected to 7%-O_2dry volume[b]
17	14-AAL-082	Blower Exhaust O_2 Low	≤ 3% O_2
17.a	14-AAH-082	Blower Exhaust O_2 High	≥ 15% O_2
18	24-AAL-670	Blower Exhaust O_2 Low	≤ 3% O_2
18.a	24-AAH-670	Blower Exhaust O_2 High	≥ 15% O_2
19	PAS 703G and PAS 703V[f]	PAS Blower Exhaust Agent Detected	≥ 0.2 ASC for GB and ≥ 0.5 ASC[e] for VX
20	PAS 701G	Common Stack Exhaust Agent Detect	≥ 0.2 ASC[c,d]
20a	PAS 706V	Common Stack Exhaust Agent Detect	≥ 0.2 ASC[c,d]
21	23-BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-02 and 23-LSHH-06 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level

Footnotes:

[a] Waste feed cut-offs are activated and recorded by PDARS when the associated setpoint is equaled or exceeded.

[b] One hour rolling average is composed of the 60 most recent one minute averages. Each one-minute average is composed of 4 most recent instantaneous CO process variables, which occur at 15-second intervals.

[c] The alarm settings (in mg/m3) for each agent are: GB=0.00006, VX=0.00006, and H/HD/HT=0.006.

[d] An Automatic WFCO occurs if the two online ACAMS are not staggered so that at least one unit is sampling the stack.

[e] The alarm setting (in mg/m3) for VX agent is 0.00015.

[f] PAS 703AV, PAS 703BV and PAS 703CG, PAS 703DG are the TAG IDs for this sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline.

[g] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
1	Jammed Chute Line A Waste Feed Interlock 16-XS-207	Radioactive Proximity Switch	Feed Chute DFS Kiln Room	On-Off	Not Applicable
2	Jammed Chute Line B Waste Feed Interlock 16-XS-209	Radioactive Proximity Switch	Feed Chute DFS Kiln Room	On-Off	Not Applicable
3	Agent Feed Rate Agent Quantification System RSM-101 51-LIT-051	DP Level Indicating/transmitter	Explosive Containment Room A	0 to 30 in. W.C.	7.0 to 15.2 in. W.C.
3.a	Agent Feed Rate Agent Quantification System RSM-102 51-LIT-057	DP Level Indicating/transmitter	Explosive Containment Room B	0 to 30 in. W.C.	7.0 to 15.2 in. W.C.
4.a	Rocket Feed Rate RSM-101 & RSM-102	DFS Process Control Software	Not Applicable	Not Applicable	0 - 33 rockets/hr
4.b	Propellant, Explosive, and Pyrotechnic (PEP) Feed Rate	DFS Process Control Software	Not Applicable	Not Applicable	0 - 743.4 lb/hr
4.c[k]	Simultaneous Processing Feed Rate	DFS Process Control Software	Not Applicable	Not Applicable	0 - 1 rockets/hr 0 - 125.8 lb PEP per hour
5	Kiln Rotational Speed Calculated from 16-ZX-602	Proximity Switch	Kiln Exterior	Not Applicable	0.33 to 2.0 rpm
6	Kiln Speed Low Waste Feed Interlock 16-SALL-602	Speed (proximity) Switch	Kiln Exterior	Not Applicable	set point 0.33 rpm
7[a,b]	Kiln Pressure 16-PIT-018	Diaphragm	Furnace	-2.0 to 1.0 in. w.c.	-0.1 to -2.0 in. w.c.
7.a	Kiln Pressure High Waste Feed Interlock 16-PSHH-204	Diaphragm	Furnace	-0.5 to 0.5 in. w.c.	set point -0.1 in. w.c.
8[af,b,c]	Kiln Exhaust Temp. Pre Quench 16-TIT-182 16-TIT-244[d]	Thermocouple	Furnace	0 - 2,300° F	950-1,750° F
9[a,b,c]	Kiln Exhaust Temp. Post Quench 16-TIT-008 16-TIT-169[d]	Thermocouple	Kiln Exhaust Gas Duct	0 - 2,300° F	850- 1,650° F
10[a,b,c]	Discharge Conveyor Temperature (lower) 16-TIT-042	Thermocouple	Conveyor	0 -1,600° F	1,000-1,300° F
11[a,b,c]	Discharge Conveyor Temperature (upper) 16-TIT-184	Thermocouple	Conveyor	0 -1,600° F	1,000-1,300° F
12	Discharge Conveyor Tip Gate Jam Waste Feed Interlock 16-XS-058	Radioactive Limit Switch	Upper Discharge Conveyor Gate	Not Applicable	Not Applicable
13	Discharge Conveyor Slide Gate Jam Waste Feed Interlock 16-XS-821	Radioactive Limit Switch	Lower Discharge Conveyor Gate	Not Applicable	Not Applicable

Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
14	Discharge Conveyor Speed Low Waste Feed Interlock 16-SSL-057	Speed (Proximity) Switch	Discharge Conveyor Tail Shaft	On-Off	set point zero speed
15[a,b,c]	Exhaust Gas Afterburner 16-TIT-092 16-TIT-003[d]	Thermocouple	In-Line	0-2,400° F	2,050-2,350° F
16[a,b,c]	Afterburner Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9430A, 24-FIT-9430B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-102 outlet	3,818-38,126 acfm	25,000-30,000 acfm
16a[a,b,c]	V-Cone Pressure (STP pressure correction) 24-PIT-9430	Diaphram	In-Line at packed bed scrubber PAS-SCRB-102 outlet	8-13 psia	10-11 psia
16b[a,b,c]	V-Cone Temperature (STP Temperature correction) 24-TIT-9430	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-102 outlet	100-200° F	140-180° F
17[a,b,c]	Quench Tower Exhaust Gas Temp 24-TIT-374	Thermocouple	In-Line	0-300° F	140-200° F
17.a	Quench Tower Exhaust Gas High Temp Waste Feed Interlock 24-TSHH-001	Filled System	In-Line	175-360° F	Set point 200° F
18[a,b,c]	Quench Brine Specific Gravity 24-DIT-033	Magnetically Vibrated Tube	PAS Pump 106/107 Discharge	0.6 - 1.40 SGU	1.0- 1.20 SGU
19[a,b,c]	Quench Brine pH 24-AIT-007A[e] 24-AIT-007B	Electrode	PAS Pump 106/107 Discharge	0-14 pH Units	7-11 pH Units
20[a,b,c]	Quench Brine Pressure 24-PIT-011	Diaphragm	In-Line	0-200 psig	75-200 psig
21[a,b,c]	Quench Brine to Venturi Scrubber 24-FIT-006	Electro-magnetic Flowmeter	In-Line	0-400 GPM	300-400 GPM
22[a,b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-008	D/P Cell	Venturi Scrubber	0-50 in. w.c.	20-50 in. w.c.
23[a,b,c]	Clean Liquor to Scrubber Tower Sprays 24-FIT-030	Electro-magnetic Flowmeter	In-Line	0-3,000 GPM	750 - 2,400 GPM
24[a,b,c]	Clean Liquor Pressure 24-PIT-036	Diaphragm	In-Line	0-100 psi	30-100 psig
25[a,b,c]	Blower Exhaust Gas O_2 24-AIT-206	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0-25%	3-15%
26[a,b,c]	Blower Exhaust Gas O_2 16-AIT-175	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0-25%	3-15%
27[a,b,c]	Blower Exhaust Gas CO 24-AIT-207	Infrared Cell Analyzer	In-Line (Extractive)	0-200 & 0-3,000 ppm	0 – 100 ppm
28[a,b,c]	Blower Exhaust Gas CO 16-AIT-059	Infrared Cell Analyzer	In-Line (Extractive)	0-200 & 0-3,000 ppm	0 – 100 ppm

Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
29[a,b,c]	Blower Exhaust Gas Agent PAS 702V and 702G[g]	ACAMS[i]	In-Line (Extractive)	0-512 ASC[j]	0- 1.0 ASC
30	Common Stack Exhaust Gas Agent PAS 701G[h]	ACAMS[i]	In-Line (Extractive)	0-512 ASC[j]	0- 1.0 ASC
30a	Common Stack Exhaust Gas Agent PAS 706V[h]	ACAMS[i]	In-Line (Extractive)	0-512 ASC[j]	0- 1.0 ASC
31	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable

Footnotes:

1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).

[a] Continuous Monitoring with values being recorded electronically, approximately every 30 seconds.

[b] Continuous Recording every hour with the minimum and maximum values printed during one hour segment of operation.

[c] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.

[d] Control loop number corresponds to bolded Tag ID. Controller algorithms manipulate the output of both transmitters to determine the process variable as follows:

The controller averages the output of both transmitters, if the transmitter outputs differ by less than 32° F.

The controller uses the transmitter with the highest output, if the transmitter outputs differ by greater than 32° F and the associated waste feed interlock is activated when the temperature becomes greater than the set point value.

The controller uses the transmitter with the lowest output, if the transmitter outputs differ by greater than 32° F and the associated waste feed when the temperature becomes less than the set point value.

The controller uses the transmitter with the lowest output, if the transmitter outputs differ by greater than 32° F and the high transmitter's output is at full scale (i.e., 20 milliamps, or maximum instrument range).

[e] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.

[f] Reserved.

[g] PAS 702AV, PAS 702BV and PAS 702CG, PAS 702DG are the TAG IDs for the sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be online at all times during agent operations.

[h] PAS 701 and PAS 706 are the TAG IDs for the sampling location. Two ACAMS are online and collocated DAAMS tubes at all times during agent operations for each agent.

[i] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or H/HD/HT.

[j] ASC (Allowable Stack Concentration) - Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The ASC (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and H/HD/HT = 0.03.

[k] Only required when simultaneously processing GB rockets and GB projectiles in the DFS.

* Calibration information is shown in Attachment 6.

Table D-7-2
DEACTIVATION FURNACE SYSTEM
AUTOMATIC WASTE FEED CUT-OFFS[1]

Item No.	Tag Number	Kiln [g]Rotation	Process Data Description [f]	Set point[k]
1	16-XS-207	3	Jammed Chute Line A	Feed Chute Filled 10 second delay
2	16-XS-209	3	Jammed Chute Line B	Feed Chute Filled 10 second delay
3	WFR-1HR-DFS	3	Agent Feed Rate Limit	> 9.1 lbs/hr[a]
4.a	DFS-RKFDRT	3	Rocket Feed Rate Limit	> 33 rockets/hr[b]
4.b	PEP-1HR-DFS	3	Propellant, Explosives, and Pyrotechnics (PEP) Feed Greater Than	> 359 lb PEP/hr
4.c[i]	DFS-RKFDRT DFS-PJFDRT DFS-AQS-FDRT	3	Simultaneous Processing Feed Rates Greater Than Either	> 1 rocket/hr or > 125.8 lb PEP/hr or > 10.7 lb/hr (agent)
5	16-SAHH-602	4	Kiln Speed (rpm) Greater Than or Equal to	≥ 2 RPM
6	16-SALL-602	2	Kiln Rotation Less Than or Equal to	≤ 0.33 RPM
7	16-PSHH-204	3	Kiln Combustion Chamber Pressure: Greater Than	> -0.1 in. w.c.
8	16-TIT-182	4	Kiln Exhaust Gas Pre Quench Temperature Less Than or Equal to	≤ 954° F, one-hour rolling average
9	16-TAHH-008	3	Kiln Exhaust Gas Post Quench Temperature Greater Than	> 1,650° F
10	16-TALL-042	5	Lower Heated Discharge Conveyor Temperature Less Than or Equal to	≤ 1,000° F
11	16-TALL-184	5	Upper Heated Discharge Conveyor Temperature Less Than or Equal to	≤ 1,000° F
12	16-XS-058	5	Jam in Discharge Conveyor	Discharge Chute Filled 10 second delay
13	16-XS-821	5	Jam in Discharge Conveyor	Discharge Chute Filled 10 second delay
14	16-SSL-057	5	No Motion on Heated Discharge Conveyor	No Motion
15	16-TIT-092	3	Afterburner Temperature Less Than or Equal to	≤ 2065° F, one-hour rolling average
15.a	16-TAHH-092	3	Afterburner Temperature Greater Than or Equal to	≥ 2350° F
16	24-FIT-9430	3	Exhaust Gas Flow Rate (Unit Production Rate) Greater Than or Equal to	≥ 13,210 scfm, one-hour rolling average
17	24-TSHH-001	3	Quench Tower Exhaust Gas Temperature Greater Than	> 200° F
18	24-DIC-033	3	Quench Brine Specific Gravity Greater Than or Equal to	≥ 1.10 SGU, twelve-hour rolling average
19	24-AIT-007	3	Brine to Venturi Scrubber pH Less Than or Equal to	≤ 8.7 pH, one-hour rolling average
20	24-PALL-011	3	Quench Brine Pressure Less Than or Equal to	≤ 75 psig
21	24-FIT-006	3	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 310 gpm, one-hour rolling average
22	24-PDIT-008	3	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 30 in. w.c., one-hour rolling average
23	24-FIT-030	3	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 800 gpm, one-hour rolling average
24	24-PIT-036	3	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig, one-hour rolling average
25	24-AAH-206	3	PAS Blower Exhaust O_2 Greater Than or Equal to	≥ 15% O_2
25.a	24-AAL-206	3	PAS Blower Exhaust O_2 Less Than or Equal to	≤ 3% O_2
26	16-AAH-175	3	PAS Blower Exhaust O_2 Greater Than or Equal to	≥ 15% O_2
26.a	16-AAL-175	3	PAS Blower Exhaust O_2 Less Than or Equal to	≤ 3% O_2
27	24-AIT-207	3	PAS Blower Exhaust CO Greater Than or Equal to	≥ 100 ppm, one-hour rolling average [c]
28	16-AIT-059	3	PAS Blower Exhaust CO Greater Than or Equal to	≥ 100 ppm, one-hour rolling average[c]
29	PAS 702G and 702V	3	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 ASC[e] for GB or 0.5 ASC VX[d]

Table D-7-2
DEACTIVATION FURNACE SYSTEM
AUTOMATIC WASTE FEED CUT-OFFS[1]

Item No.	Tag Number	Kiln [g]Rotation	Process Data Description [f]	Set point[k]
30	PAS 701G	3	Common Stack Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 ASC[e,h]
30a	PAS 706V	3	Common Stack Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 ASC[e,h]
31	23-BRA-TNKS	3	Brine Surge Tanks 101,102,201,202,Four Levels High-High (BRA-TNKS = 23-LSHH-02 and 23-LSHH-06 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level

Footnotes:

[1] Line A and B feed gates may be manually cycled once after a waste feed cut-off alarm is activated providing the primary and secondary combustion temperatures are above the minimum permit limits. This manual operation will be used to clear any partially treated (chopped) energetic components from the outer surfaces of the gates.

[a] The agent feed rate waste feed cutoff is activated when the rolling hourly sum of each difference calculated between the "as manufactured" rocket agent fill volume minus the volume drained from each rocket (as determined by the Agent Quantification System) exceeds 17.0 pounds per hour.

[b] The rocket feed rate waste feed cutoff is activated when the rolling hourly sum of rockets fed to the DFS exceeds 33 rockets per hour.

[c] One hour rolling average is composed of the 60 most recent one minute averages. Each one-minute average is composed of 4 instantaneous CO process variables which occurred at 15 second intervals.

[d] The alarm setting (in mg/m^3) for VX agent is 0.00015.

[e] The alarm settings (in mg/m^3) for each agent are: GB =0.00006, VX =0.00006, and H/HD/HT = 0.006.

[f] Logic code description used to set the control WFCO alarms.

[g] Kiln rotation and HDC motion during a waste cut-off will be as follows:

2. HDC motion shall be maintained when waste feed cut-off is activated.
3. Kiln rotation and HDC motion are maintained when waste feed cut-off is activated.
4. Kiln oscillates and HDC motion is maintained when waste feed cut-off is activated.
5. Kiln oscillates and HDC motion stops when waste feed cut-off is activated.

[h] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[i] Only required when simultaneously processing GB rockets and GB projectiles in the DFS.

[j] PAS 702AV, PAS 702BV and PAS 702CG, PAS 702DG are the TAG IDs for this sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline.

[k] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds